The Genus Cercospora in Indonesia

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With plates 108 (1) – 111 (4)

Introduction

The genus *Cercospora* is one of the largest genera of the family *Dematiaceae*. It consists entirely of obligatory parasites on vascular plants. The species are limited in their host range; some are even restricted to a single host-species. Furthermore on one and the same host, more than one species of *Cercospora* may sometimes be found. A well known example is furnished by *Arachis hypogaea*, which often harbours at the same time *Cercospora personata* and *Cercospora arachidicola*.

Especially in the tropics, owing to the presence of a very large number of different vascular plants, do we encounter most of the representatives of the genus *Cercospora*.

Up to now only 23 species were mentioned for Indonesia. At present I can list 90 species of *Cercospora* and I am convinced, that this number may be easily increased in the future.

In the next account, the species are listed under the host-families, which are alphabetically arranged.

The following abbreviations have been used for collector names, viz. B. = Boedijn, R. = Raciborski.

ACANTHACEAE

Cercospora rhinacanthi v. Höhnel, Sitzungsber. k. Akad. Wiss. Wien 121, 414, 1912.

Syn.: *Cercosporina rhinacanthi* (v. Höhnel) Sacc., Syll. Fung. 25, 917, 1931.

on *Rhinacanthus* spec., *Rhinacanthus nasutus*.

Java, Hortus Bogoriensis 1907 v. Höhnel, Bogor Aug. 1949, Jan. 1950 B.

CERCOSPORA THUNBERGIAE Boedijn nov. spec. (fig. 1)

Maculae irregularis vel angulatae et venulis limitatae, obscure brunneae, 2–6 mm. longae. Caespituli hypophylli. Stromata minuta vel nulla. Conidiophora laxe sparsa vel fasciculata, pallide olivaceo-brunnea haud, septata et geniculata ad apicem subtruncata 5–30 × 2–3 μ. Conidia subhyalina,

anguste obclavata, recta vel leniter curvata, spurie multiseptata, ad basim subtruncata ad apicem acuta 49–94 × 2–3 μ plerumque 64–72 × 2½ μ.

Leafspots dull brown to sepia, irregular, often angular and vein bound, 2–6 mm. long. Fruiting especially hypophyllous. Stromata slight or none. Conidiophores as short branches spaced at rather short intervals and in bundles on procumbent threads, pale brown, not septate nor geniculate, tip subtruncate 5–30 × 2–3 μ. Mycelial threads pale grayish brown to subhyaline, branched, septated 1½–3 μ broad.

Conidia subhyaline, acicular, straight to slightly curved, indistinctly multiseptate, base obconic, tip acute 49–94 × 2–3 μ, mostly 64–72 × 2½ μ.

On *Thunbergia alata.*

Java, Hortus Bogoriensis April 1950 B.

ANACARDIACEAE

Cercospora mangiferae Koorders, Verh. k. Akad. Wetensch. Amsterdam 13, 236, 1907.

on *Mangifera foetida* and *Mangifera indica.*

Java, Hortus Bogoriensis March 1950, May 1950 B. Purworedjo, Kedu Sept. 1905 Koorders.

This is a somewhat aberrant *Cercospora* species. The color of the conidia is rather dark and almost reddish brown, a hue not observed in other species. Moreover under ordinary high power of the microscope, the walls appear double. According to Chupp (5) this would exclude it altogether from our genus. As it is difficult to find another genus for our species, it may for the present remain in *Cercospora.*

APOCYNACEAE

Cercospora plumeriae Chupp, Mon. Fungus genus Cercospora p. 49, 1953.

on *Plumeria acuminata.*

Java, Bogor July 1949 B. Hortus Bogoriensis July 1950 B.

ARACEAE

Cercospora amorphophalli Henn., Hedwigia 41, 147, 1902.

on *Amorphophallus* spec. and *Amorphophallus variabilis.*

Java, Bogor Dec. 1901 Zimmermann, Hortus Bogoriensis Jan. 1950 Tojib Hadiwidjaja, May 1950 B. Tjianten Jan. 1932 B.

Leafspots in our material brown, 15 mm. long, by coalescing often much longer. Conidia 72–122 × 3½–4 μ.

Cercospora colocasiae CHUPP, Mon. Fungus genus Cercospora p. 58, 1953.
Syn.: *Cercospora caladii* COOKE var. *colocasiae* v. HÖHNEL, Sitzungsber. k. Akad. Wiss. Wien 116, 150, 1907.
on *Alocasia macrorhiza*.
Java, Bogor June 1950 B.
Cercospora alocasiae SAWADA, Taiwan Agr. Rev. 38, 693, 1942 found on the same host, is described as possessing hyaline acicular conidia.
Our material however shows pale olivaceous obclavato-cylindric conidia, 52–100 × 3–4 μ, and also in all other characters neatly agrees with the description as given by CHUPP.
Cercospora extremorum SYD., Ann. Mycol. 15, 264, 1917.
on *Homalomena rubra* and on *Araceae* prob. *Homalomena*.
Java, Hortus Bogoriensis Aug. 1950, Djasinga Jan. 1955 B.
Cercospora protensa SYD., Ann. Mycol. 28, 446, 1930.
on *Amorphophallus variabilis* and *Amorphophallus* spec.
Java, Hortus Bogoriensis June 1941, June 1953 B. Bogor Jan. 1950 B. Pasar Mingu March 1950 B.
This species is very different from *Cercospora amorphophalli* HENN. It forms effuse, olivaceous patches on the underside of the leaves, often occupying large areas. The conidia are mostly strongly bent.
Cercospora rhichardiaecola ATKINSON, Journ. Elisha Mitchell Sc. Soc. 8, 51, 1892.
on *Zantedeschia* spec. (*Richardia*).
Java, Hortus Bogoriensis June 1950 B.

ARALIACEAE

Cercospora panacis THIRUMALACHAR et CHUPP, Mycologia 40, 358, 1948.
on *Nothopanax primatum* and *Nothopanax* spec.
Java, Hortus Bogoriensis Dec. 1949, May 1950 B.

CERCOSPORA SCHEFFLERAE BOEDIJN nov. spec. (fig. 2)

Maculae orbiculares, pallide brunneae, zonula edita cinctae, 1–2 mm diam. Caespituli amphigeni. Stromata minuta, subglobosa, fusca 10–40 μ diam. Conidiophora 5–20 diverse fasciculata, pallide olivaceo-brunnea, sursum pallidiora, parce septata, vix ramosa et geniculata, ad apicem subtruncata, 40–70 × 3–4 μ. Conidia pallide olivacea, subcylindrica, recta vel leniter curvata, obscure 3–7 septata, ad basim subtruncata, ad apicem subrotundata 25–51 × 2 ½–4 μ, plerumque 32–37 × 3–3 ½ μ.

Leafspots orbicular, pale brown, with strongly raised border, 1–2 mm in diameter. Fruiting amphigenous. Stromata filling substomatal airspace, small, subglobular, dark brown, 10–40 μ in dia-

meter. Fascicles in groups of 5 to 20 or more stalks, divergent. Conidiophores pale brown, subhyaline towards the tips, sparingly septate, seldom branched, weakly geniculate tip subconic, 40–70×3–4 μ. Conidia pale olivaceous, almost cylindric straight to slightly curved, indistinctly 3–7 septate, base obconic, tip rounded, 25–51×2½–4 μ, mostly 32–37×3–3½ μ.
on *Schefflera obovata.*
Java, Hortus Bogoriensis Aug. 1953 B.

BALSAMINACEAE

Cercospora Fukushiana (Matsuura) Yamamoto, Journ. Plant Prot. 14, 699, 1929.
Syn.: *Cercosporina Fukushiana* Matsuura, Trans. Tattori Soc. Agr. Sc. Japan 1, 83, 1928.
Cercospora balsaminae Mendoza, Philipp. Journ. Sc. 75, 166, 1941.
on *Impatiens* spec.
Java, Hortus Bogoriensis April 1950 B.

BIGNONIACEAE

CERCOSPORA RADERMACHERAE Boedijn nov. spec. (fig. 3)

Maculae suborbiculares vel angulatae, pallide brunneae vel griseae, 1–5 mm. diam. Caespituli amphigeni. Stromata fere deficiens. Conidiophora fasciculata, olivaceo-brunnea, septata non ramosa et geniculata, interdum leviter undulata, ad apicem subtruncata, 24–80×2–3 μ. Conidia hyalina, obclavata, recta vel leniter curvata, spurie multiseptata, ad basim subtruncata, ad apicem subacuta, 32–58×2–3 μ, plerumque 40–50×2½ μ.

Leafspots subcircular to angular, pale brown to pale gray, 1–5 mm. in diameter. Fruiting amphigenous. Stromata slight. Fascicles fairly dense. Conidiophores brown, unbranched, septate, not geniculate, sometimes weakly undulating, tip bluntly rounded, 24–80×2–3 μ. Conidia hyaline, obclavate, straight to slightly curved, indistinctly multiseptate, base obconic, tip subacute 32–58×2–3 μ, mostly 40–50 ×2½ μ.
on *Radermachera glandulata.*
Java, Hortus Bogoriensis July 1950 B.

CARICACEAE

Cercospora papayae Hansford, Proc. Linn. Soc. London 42/43, 58, 1943.

on *Carica papaya* and *Carica monoica*.
Java, Patjet June 1950 Reitsma.

CHENOPODIACEAE

Cercospora beticola SACC., Nuov. Giorn. Bot. Ital. 8, 189, 1876.
Syn.: *Cercospora betae* FRANK, Krankh. d. Pflanze p. 601, 1880.
Cercospora longissima COOKE et ELLIS, Grevillea 17, 65, 1889.
Cercospora flagelliformis E. et H., N. Jer. Ann. Rept. 1890, p. 355, 1891.
Cercospora anthelmintica ATKINSON, Journ. Elisha Mitchell Sc. Soc. 8, 49, 1892.
Cercospora spinaciae OUDEMANS, Nederl. Kruidk. Arch. iii, 2, 314, 1900.
Cercospora chenopodiicola BRES., Hedwigia 39, 328, 1900.
Cercosporina spinacicola SACC., Nuov. Giorn. Bot. Ital. n.s. 22, 73, 1915.
on *Beta vulgaris* and *Beta chiliensis*.
Java, Bogor April 1943 REITSMA, Nov. 1948 B. Tjipanas Febr. 1950 NIEUWSTRATEN.

COCHLOSPERMACEAE

Cercospora cochlospermi BAKER et DALE, Mycol. Papers Commonwealth Mycol. Inst. 33, 101, 1951.
on *Cochlospermum* spec.
Java, Hortus Bogoriensis April 1950 B.

COMBRETACEAE

CERCOSPORA COMBRETI BOEDIJN nov. spec. (fig. 4)

Maculae indeterminatae, pallide brunneae, confluentes et saepe fere totam folii marginam obtegentis. Caespituli epiphylli. Stromata subglobosa, atro fuliginea, 30–50 μ diam. Conidiophora densissime fasciculata, olivaceo-brunnea, sursum pallidiora, vix septata, parce ramosa et geniculata, interdum undulata, ad apicem subacuta 60–100 × 3–4 μ. Conidia subhyalina vel pallidissime olivacea, obclavata, vel cylindro-obclavata, recta vel leniter curvata, spurie 3–7 septata, ad basim subtruncata, ad apicem subacuta, 40–68 × 3–4 μ, plerumque 50–60 × 3½ μ.

Leafspots undefinite, pale brown, coalescing and covering much of the leafmargin. Fruiting epiphyllous, Stromata subglobular, blackish brown, 30–50 μ in diameter. Fascicles very dense. Conidiophores olive brown, paler towards the tip, sparingly septate, sometimes undulating,

seldom branched, weakly geniculate, tip subacute, 60–100×3–4 μ. Conidia subhyaline to weakly colored, obclavate to cylindro-obclavate, straight to slightly curved, indistinctly 3–7 septate, base obconic, tip subacute, 40–68×3–4 μ, mostly 50–60×3½ μ.
on *Combretum* spec.
Java, Hortus Bogoriensis July 1950 B.
Cercospora catappae Henn., in Engler's Bot. Jahrb. 34, 56, 1905.
Syn.: *Cercospora terminaliae* Sawada, Formosa Agr. Rev. 38, 701, 1942.
on *Terminalia catappa.*
Pulu Sertung Jan. April 1933 B.

COMPOSITAE

Cercospora bidentis Tharp, Mycologia 9, 108, 1917.
Syn.: *Cercospora bidentis* Marchal et Steyaert, Bull. Soc. R. Bot. Belg. 61, 167, 1929.
on *Bidens pilosus.*
Java, Bogor Aug. 1949 B.

In this material leafspots 1–3 mm. in diameter, almost white with a dark margin. On the underside pale brown, with raised border.
Cercospora eupatorii Peck, N.Y. State Mus. Nat. Hist. Ann. Rept. 33, 29, 1880.
on *Eupatorium odoratum.*
Java, Hortus Bogoriensis April 1950 B.
Cercospora lactucae-sativae Sawada, Formosa Agr. Res. Inst. Rept. 35, 111, 1928.
Syn.: *Cercospora longissima* (Cugini in Herb.) Sacc., Syll. Fung. 18, 607, 1906 (non *C. longissima* Cooke et Ellis).
Cercospora lactucae Stevenson, Journ. Dept. Agr. Puerto Rico 1, 105, 1917.
Cercospora lactucae Welles, Phytopathology 13, 289, 1923.
Cercospora ixeridis-chinensis Sawada, Formosa Agr. Res. Inst. Rept. 86, 171, 1943.
Cercospora lactucae-indicae Sawada, Formosa Agr. Res. Inst. Rept. 86, 172, 1943.
on *Lactuca sativa.*
Java, Bogor, May, July 1943 B.

Chupp in his monograph of the genus *Cercospora* uses the name *C. longissima* (Cugini in Herb.) Sacc. for our species. But as there already exist a *C. longissima* Cooke et Ellis, I am obliged to reject this name.

CONVOLVULACEAE

Cercospora timorensis COOKE, Grevillea 12, 38, 1883.
Syn.: *Cercospora batatae* ZIMM., Ber. Land. Forstw. Deutsch Ostafrika 2, 28, 1904.
Cercospora batatae HENN., in Engler's Bot. Jahrb. 38, 118, 1907.
on *Ipomoea batatas* and *Ipomoea cymosa*.
Java, Bogor Nov. 1949 B. July 1950 REITSMA.
Timor-laut June 1883 RIEDEL.
Cercospora ipomoeae WINTER, Hedwigia 26, 34, 1887.
Syn.: *Cercospora virudula* ELLIS et EVERH., Journ. Mycol. 5, 70, 1889.
Cercospora alabamensis ATKINSON, Journ. Elisha Mitchell Sc. Soc. 8, 51, 1892.
Cercospora stuckertiana SYD., Mém. Herb. Boissier 8 (4) 2, 1900.
on *Operculina turpethum* and *Operculina* spec.
Krakatau April 1933 B. Java, Hortus Bogoriensis April, June, Aug. 1950 B.

Though our material is growing on *Operculina*, it is not identical with *Cercospora operculina* MENDOZA, Philipp. Journ. Sc. 75, 174, 1941, which according to the description is a wholly different species.

CRASSULACEAE

CERCOSPORA KALANCHOES BOEDIJN nov. spec. (fig. 5)

Maculae suborbiculares, pallide brunneae, plerumque zonula obscura cinctae, 2–10 mm. diam. Caespituli epiphylli. Stromata parva, fusca 14–38 μ diam. Conidiophora laxe fasciculata, olivaceo-brunnea, sursum palidiora non ramosa, parce septata et geniculata, ad apicem subtruncata, 40–96 × 3–4½ μ. Conidia hyalina, obclavata vel anguste obclavata, recta vel leniter curvata, spurie multiseptata, ad basim truncata, ad apicem acuta 90–173 × 2½–4 μ, plerumque 96–104 × 3 μ.

Leafspots subcircular, pale brown, mostly with a dark border, 2–3 mm., afterwards up to 10 mm. in diameter. Fruiting especially epiphyllous. Stromata rather small, dark brown, 14–38 μ in diameter. Fascicles in groups of 3 to 10 stalks. Conidiophores brown, a triffle paler towards the tip, unbranched, sparingly septate and geniculate, tip conic to bluntly rounded, 40–96 × 3–4½ μ. Conidia hyaline, obclavate to almost acicular, straight to slightly curved, indistinctly multiseptate, base truncate, tip acute, 90–173 × 2½–4 μ, mostly 96–104 × 3 μ.
on *Kalanchoe* spec.
Java, Hortus Bogoriensis March 1950 B.

CUCURBITACEAE

Cercospora citrullina COOKE, Grevillea 12, 31, 1883.
Syn.: *Cercospora cucurbitae* ELLIS et EVERH., Journ. Mycol. 4, 3, 1888.
Cercospora sechii STEVENSON, P. Rico Ins. Exp. Stat. Dept. Agr. Ann. Rept. 1917, 18, 137, 1919.
Cercospora luffae HARA, Diseases of cultivated plants p. 228, 1928.
Cercospora momordicae McREA, Ann. Crypt. exotique 2, 267, 1929.
Cercospora trichosanthis McREA, Ann. Crypt. exotique 2, 270, 1929.
Cercospora chardoniana CHUPP, Mon. Univ. P. Rico B. 2, 245, 1934.
Cercospora momordicae MENDOZA, Philipp. Journ. Sc. 75, 173, 1941.
Cercospora momordicae SAWADA, Formosa Agr. Res. Inst. Rept. 86, 173, 1943.
on *Momordica charantia* and *Luffa* spec.
Java, March 1942, July 1943 B.

CYPERACEAE

Cercospora cyperi-rotundi THIRUMALACHAR et GOVINDU, Sydowia 7, 312, 1953.
on *Cyperus rotundus*.
Java, Lawang Bedali May 1950 v. HOOF.

DIOSCOREACEAE

Cercospora ubi RAC., Par. Alg. u. Pilze Java's 3, 39, 1900.
Syn.: *Cercospora brasiliensis* AVERNA, Bol. Agr. Sao Paulo 18 A 7, 580, 1917.
on *Dioscorea alata*, *Dioscorea bulbifera* and *Dioscorea* spec.
Java, Bogor R. Hortus Bogoriensis April 1950 B.
Cercospora dioscoreae ELLIS et MARTIN, Amer. Nat. 16, 1003, 1882.
Syn.: *Cercospora nubilosa* ELLIS et EVERH., Journ. Mycol. 4, 115, 1888.
Cercospora tokoroi TOGASHI, Imp. College Agr. Forst. Morioka Bul. 22, 46, 1936.
on *Dioscorea hispida*.
Java, Bogor Jan. 1950 B. Pasar Mingu March 1950 v. HOOF.
Cercospora carbonacea MILES, Trans. Jll. Acad. Sc. 10, 255, 1917.
on *Dioscorea* spec.
Java, Hortus Bogoriensis April 1950 B.

ELAEOCARPACEAE

Cercospora muntingiae PETRAK et CIFERRI, Ann. Mycol. 30, 324, 1932.
on *Muntingia calabura.*
Java, Bogor Febr. 1950 B.

EUPHORBIACEAE

Cercospora Henningsii ALLESCHER, in Engler's Pflanzenwelt Ost Afrikas, Teil C p. 35, 1895.
Syn.: *Cercospora cassavae* ELLIS et EVERH., Bull. Torrey Bot. Club 22, 438, 1895.
Cercospora manihotis HENN., Hedwigia 41, Beibl. 18, 1902.
Septogloeum manihotis ZIMM., Centralbl. Bakt. etc. Abt. 2, 8, 218, 1902.
Cercospora cearae PETCH, Ann. R. Bot. Garden Peradeniya 3, 10, 1906.
Helminthosporium manihotis RANGEL, Arch. Jard. Bot. Rio de Janeiro 2, 71, 1917.
on *Manihot utilissima.*
Sumatra, Sungai Pantjur Febr. 1926 B.
Java, Bogor Aug. 1922, June 1941 B.
Cercospora ricinella SACC. et BERL., Atti R. Ist. Ven. Sc. Lett. Arti VI, 3, 721, 1885.
Syn.: *Cercospora albido-maculans* WINTER, Hedwigia 24, 202, 1885.
Cercospora ricini SPEG., Anal. Mus. Nac. B. Aires ser. 2, 3, 343, 1899.
Cercosporina ricinella (SACC. et BERL.) SPEG., Anal. Mus. Nac. B. Aires 20, 429, 1910.
on *Ricinus communis.*
Sumatra, Kampong Baru April 1926 B.
Cercospora tiglii HENN., Hedwigia 47, 265, 1908.
Syn.: *Cercospora trinidadensis* STEVENS et SOLHEIM, Mycologia 23, 376, 1931.
on *Croton tiglium.*
Java, Hortus Bogoriensis Febr. 1942, Nov. 1950 B. Bogor, Dec. 1949 B.

GRAMINEAE

Cercospora Koepkei KRÜGER, Ber. Versuch. Stat. Zuckerr. W. Java 1, 115, 1890.
Syn.: *Cercospora longipes* BUTLER, Dept. Agr. India Mem. 1, 41, 1906.
on *Saccharum officinarum.*

Java, Kagok Tegal W. KRÜGER.
Cercospora vaginae KRÜGER, Ber. Versuch. Stat. Zuckerr. W. Java 1, 64, 1890.
on *Saccharum officinarum*.
Java, Kagok Tegal W. KRÜGER.
Cercospora sorghi ELLIS et EVERH., Journ. Mycol. 3, 15, 1887.
on *Sorghum* spec.
Java, Bogor May 1950 v. HOOF.

LABIATAE

CERCOSPORA COLEI BOEDIJN nov. spec. (fig. 6)

Maculae suborbiculares vel elongatae, fere albidae, zonula obscura cinctae, ½–1 mm. diam. Caespituli epiphylli. Stromata subglobosa, brunnea, 20–45 μ diam. Conidiophora laxe fasciculata, pallide olivaceo-brunnea, sursum pallidiora, haud septata, geniculata, ad apicem subtruncata 20–50 × 3½–4½ μ. Conidia hyalina, obclavata vel anguste obclavata, leniter curvata, spurie multiseptata, ad basim truncata, ad apicem acuta 56–78 × 3–4 μ, plerumque 60–70 × 3½ μ.

Leafspots subcircular to somewhat elongated, nearly white with dark border, ½–1 mm. in diameter. Fruiting chiefly epiphyllous. Stromata subglobular, brown, 20–45 μ in diameter. Fascicles in groups of a few to about 20 stalks. Conidiophores slightly colored, paler towards the tips, not septate, geniculate, tip bluntly rounded, conidial scars distinct, 20–50 × 3½–4½ μ. Conidia hyaline, narrowly obclavate to almost acicular, slightly curved, indistinctly multiseptate, base truncate, tip acute, 56–78 × 3–4 μ, mostly 60–70 × 3½ μ.
on *Coleus atro-purpureus* and *Coleus hybridus*.
Java, Bogor July 1949 v. HOOF, Hortus Bogoriensis May 1950 B.

LAURACEAE

CERCOSPORA LITSEICOLA BOEDIJN nov. spec. (fig. 7)

Maculae suborbiculares vel irregularis, fere nigrae, postea centro griseae, 1–5 mm. diam. Caespituli epiphylli. Stromata globosa, fusca 50–150 μ diam. Conidiophora dense fasciculata, pallide olivaceo-brunnea, sursum pallidiora, non ramosa, parce septata, haud geniculata, ad apicem subtruncata, 20–40 × 2–3 μ. Conidia pallidissime olivacea, anguste obclavata vel cylindro-obclavata, leniter curvata, spurie multiseptata, ad basim subtruncata, ad apicem acuta, 49–128 × 2½–3½ μ, plerumque 56–72 × 3 μ.

Leafspots subcircular to irregular, nearly black, later with gray center, 1–5 mm. in diameter. Fruiting epiphyllous. Stromata prominent, globular, dark brown, 50–150 μ in diameter. Fascicles dense.

Conidiophores pallid brown, paler towards the tip, unbranched, sparingly septate, not geniculate, tip bluntly rounded, 20–40×2–3 μ. Conidia very pale colored, narrowly obclavate to cylindro-obclavate, mildly curved, indistinctly multiseptate, base obconic, tip acute 49–128×2½–3½ μ, mostly 56–72×3 μ.
on *Litsea* spec.
Java, Hortus Bogoriensis April 1950 B.

LEGUMINOSAE

CERCOSPORA ABRICOLA BOEDIJN nov. spec. (fig. 8)

Maculae typicae nullae, sed decolorationes flavido-viridas usque ad 1 mm. diam. efficiens. Caespituli semper epiphylli. Stromata subglobosa, fusca 20–60 μ diam. Conidiophora densiuscula fasciculata, fuliginea, sursum pallidiora, non ramosa, parce septata, geniculata et undulata, ad apicem circiter subtruncata 21–70×3–5 μ. Conidia hyalina, obclavata, recta, spurie 1–5 septata, ad basim subtruncata, ad apicem subrotundata, 21–56×3½–5 μ, plerumque 36–40×4 μ.

Leafspots hardly visible, indistinctly yellowish green, up to 1 mm. in diameter. Fruiting epiphyllous. Stromata subglobular, dark brown, 20–60 μ in diameter. Fascicles dense. Conidiophores brown, pale towards the tip, unbranched, geniculate, undulate, sparingly septate, tip more or less conic, 21–70×3–5 μ. Conidia hyaline, obclavate, straight, indistinctly 1–5 septate, base obconic, tip rounded 21–56×3½–5 μ, mostly 36–40×4 μ.
on *Abrus precatorius.*
Java, Hortus Bogoriensis July 1953 B.

Cercospora arachidicola HORI, Nishigahara Agr. Exp. St. TOKYO Ann. Rep. p. 26, 1917.
Syn.: *Cercospora arachidis* HENN. var. *macrospora* MAFFEI, Riv. Pat. Veget. 12, 7, 1922.
on *Arachis hypogaea.*
Java, Bogor April 1949 v. HOOF.

This species grows often together with *Cercospora personata* on the same leaves. Microscopically it is very different from the latter.

Cercospora personata (BERK. et CURT.) ELLIS et EVERH., Journ. Mycol. 1, 63, 1885.
Syn.: *Cladosporium personatum* BERK. et CURT., Grevillea 3, 106, 1875.
Septogloeum arachidis RAC., Zeitschr. f. Pflanzenkr. 8, 66, 1898.
Cercospora arachidis HENN., Hedwigia 41, Beiblatt 18, 1902.
on *Arachis hypogaea.*
Java, Bogor March 1925 v. SLOOTEN, June 1943, Jan. 1949 B. Tegal R.

Cercospora calopogonii STEVENS et SOLHEIM, Mycologia 23, 379, 1931.

on *Calopogonium* spec.
Java, Bogor June 1950 B.
Cercospora canavaliae Syd., Ann. Mycol. 12, 203, 1914.
on *Canavalia maritima.*
Krakatau April 1933 B.
Cercospora ternateae Petch, Ann. R. Bot. Garden Peradeniya 4, 306, 1909.
Syn.: *Cercospora pantoleuca* Syd., Philipp. Journ. Sc. 8, 284, 1913.
Cercospora clitoridis Fragosa et Ciferri, Bol. Real. Soc. Espanola Hist. Nat. Madrid 25, 456, 1925.
on *Clitoria ternatea.*
Java, Hortus Bogoriensis June 1950 B.
Cercospora pumila Syd., Philipp. Journ. Sc. 8, 196, 1913.
on *Derris elliptica.*
Java, Hortus Bogoriensis Aug. 1943, Bogor Oct. 1948 B.
Cercospora erythrinicola Tharp, Mycologia 9, 109, 1917.
Syn.: *Cercosporina erythrinicola* (Tharp) Sacc. Syll. Fung. 25, 907, 1931.
on *Erythrina* spec.
Java, Bogor Aug. 1949 B.

The hyaline conidia in this material are 52–206 × $2\frac{1}{2}$–3 μ.

Cercospora gliricidiae Syd., Philipp. Journ. Sc. 8, 283, 1913.
on *Gliricidia maculata.*
Java, Hortus Bogoriensis May 1954 B.

Chupp (5) mentions for this species dark colored, thick walled conidia 1–3 septate measuring 20–50 × 5–9 μ. Therefore he will exclude this species from the genus *Cercospora*. But I assume that he did not see the type, for our material neatly agrees with the description as given by Sydow. The pale colored, thin walled conidia, indistinctly multiseptate are measuring 44–52 × $3\frac{1}{2}$–5 μ. The measurements in the original description are 40–75 × 4–$5\frac{1}{2}$ μ.

Cercospora stizolobii Syd., Ann. Mycol. 11, 270, 1913.
Syn.: *Cercospora mucunae-ferrugineae* Yamamoto, Trans. Sapporo Nat. Hist. Soc. 13, 141, 1934.
Cercospora mucunae-capitatae Sawada, Formosa Agr. Res. Inst. Rept. 85, 116, 1943.
on *Mucuna pruriens.*
Java, Bogor Dec. 1949 v. Hoof.
Cercospora pisa-sativae Stevenson, Puerto Rico Ins. Exp. St. Ann. Rept. 1917/1918, 138, 1919.
Java. No material seen. Chupp mentions the island, without further data.
Cercospora puerariicola Yamamoto, Trans. Sapporo Nat. Hist. Soc. 13, 142, 1934.

on *Pueraria javanica.*
Java, Bogor Aug. 1949 v. Hoof.
Cercospora canescens Ellis et Martin, Amer. Nat. 16, 1003, 1882.
Syn.: *Cercospora vignicaulis* Tehon, Mycologia 29, 436, 1937.
on *Vigna marina.*
Java, Hortus Bogoriensis May 1950 B.
Cercospora dolichi Ellis et Everh., Journ. Mycol. 5, 71, 1889.
Syn.: *Cercospora vignae* Rac., Zeitschr. Pflanzenkr. 8, 66, 1898.
Cercospora Raciborskii Mats. et Nag., Journ. Plant Prot. 18, 721, 1931.
Cercospora vignae-sinensis Tai et Wei, Sinensia 4, 126, 1933.
Cercospora neovignae Yamamoto, Phytop. Lab. Contrib. Taihoku Imp. Univ. 26, 142, 1934.
Cercospora vignae-sinensis Sawada, Formosan Agr. Res. Inst. Rept. 85, 125, 1943.
on *Vigna marina* and *Vigna* spec.
Krakatau April 1933 B.
Java, Tegal R.
Cercospora cruenta Sacc., Michelia 2, 149, 1880.
Syn.: *Cercospora phaseolorum* Cooke, Grevillea 12, 30, 1883.
Cercospora vignae Ellis et Everh., Journ. Mycol. 3, 19, 1887.
Cercospora lussoniensis Sacc., Ann. Mycol. 12, 314, 1914.
Cercospora phaseoli Dearn. et Barth., Mycologia 21, 329, 1929.
on *Vigna sinensis* and *Phaseolus radiatus.*
Java, Muneng near Probolinggo May 1950 v. Hoof.

LILIACEAE

Cercospora gloriosae Syd., Ann. Crypt. exot. 2, 266, 1929.
on *Gloriosa superba.*
Java, Hortus Bogoriensis May 1950, June 1954 B.

LYTHRACEAE

Cercospora lythracearum Heald et Wolf, Mycologia 3, 18, 1911.
Syn.: *Cercospora lagerstroemiae* Syd., Ann. Mycol. 12, 203, 1914.
Cercospora lagerstroemiae-subcostatae Sawada, Descr. Catal. Formosan Fungi Part V Rept. 51, 129, 1931.
Cercospora lagerstroemiicola Sawada, Formosa Agr. Res. Inst. Rept. 85, 112, 1943.
on *Lagerstroemia* spec.
Java, Hortus Bogoriensis April 1950 B.

MAGNOLIACEAE

CERCOSPORA MICHELIAE Boedijn nov. spec. (fig. 9)

Maculae suborbiculares, griseae, linea obscuriore limitatae, 2–5 mm. diam. mox autem confluentes et saepe fere totam folii paginam omnino obtegentis. Caespituli amphigeni. Stromata fere deficiens. Conidiophora unica vel fasciculata, pallide olivaceo-brunnea, sursum pallidiora, parce septata, ad apicem subtruncata 7–36 × 3½–4½ μ. Conidia pallidissime olivacea, anguste obclavata, recta vel leniter curvata, spurie multiseptata, ad basim subtruncata ad apicem subacuta 40–91 × 3–4 μ, plerumque 70–80 × 3½ μ.

Leafspots at first subcircular, gray with dark margin, 2–5 mm. in diameter, later by coalescing irregular and sometimes covering much of the leaf surface. Fruiting amphigenous but especially hypophyllous. Stromata slight or none. Conidiophores borne singly or in fascicles on procumbent, intertwining hyphae, which are branched, septated, pale brown in color and 1½–3 μ broad. They are pale brown, subhyaline towards the tips, seldom septate, tip bluntly rounded 7–36 × 3½–4½ μ. Conidia very pale colored, narrowly obclavate, straight or mostly mildly curved, indistinctly multiseptate, base obconic, tip rounded to subacute, 40–91 × 3–4 μ, mostly 70–80 × 3½ μ.
on *Michelia champaca* and *Michelia* spec.
Java, Hortus Bogoriensis April, May 1950 B.

MALVACEAE

Cercospora malayensis Stevens et Solheim, Mycologia 23, 394, 1931.
on *Hibiscus esculentus*.
Java, Bogor 1943 Reitsma.

MARATTIACEAE

CERCOSPORA ANGIOPTERIDIS Boedijn nov. spec. (fig. 10)

Maculae angulatae vel irregularis, 2–9 mm. longae, saepe confluentes, fuscae. Caespituli epiphylli. Stromata globosa, atro-fusca, 20–40 μ diam. Conidiophora densiuscule fasciculata, pallide olivaceo-brunnea, sursum pallidiora, septata, parce geniculata, saepe interdum constricta, ad apicem subtruncata, 30–96 × 3–4 μ. Conidia subhyalina, obclavata, leniter curvata, spurie multiseptata, ad basim subtruncata ad apicem subacuta, 42–69 × 3–4 μ, plerumque 50–60 × 3–3½ μ.

Leafspots typically along the border of the pinnae, irregular triangular, 2–9 mm. long, often coalescing and consequently much longer. Color dark brown, large blotches with paler center. Fruiting epiphyllous. Stromata globular, blackish brown, 20–40 μ in diameter. Fascicles dense. Conidiophores pale brown, paler towards the tip, septate,

sparingly geniculate, often with slight constrictions, tip conic till bluntly conic, 30–96 × 3–4 μ. Conidia subhyaline, obclavate, mildly curved, indistinctly multiseptate, base obconic, tip rounded to subacute, 42–69 × 3–4 μ, mostly 50–60 × 3–3½ μ.
on *Angiopteris evecta*.
Java, Hortus Bogoriensis July 1953 B.

MENISPERMACEAE

Cercospora tinosporae SYD., Ann. Mycol. 14, 372, 1916.
on *Tinospora coriacea*.
Krakatau April 1933 B.

MORACEAE

Cercospora ficina THARP, Mycologia 9, 109, 1917.
Syn.: *Cercosporina ficina* (THARP.) SACC., Syll. Fung. 25, 911, 1935.
on *Ficus carica*.
Java, Patjet Oct. 1950 B.
Cercospora elasticae ZIMM., Inst. Bot. Buitenzorg Bull. 10, 17, 1901.
on *Ficus elastica*.
Java, Bogor ZIMMERMANN, Kaliwiro, Kedu Oct. 1905 KOORDERS.
Cercospora rufula SYD., Ann. Mycol. 21, 91, 1923.
on *Ficus* spec.
Sumatra, Deleng Singkut near Brastagi May 1927 B.

MUSACEAE

Cercospora musae ZIMM., Centralbl. Bakt. etc. II, 8, 219, 1902.
Syn.: *Cercospora musae* MASSEE, R. Bot. Gard. Kew Bull. Misc. Inf. 159, 1914.
on *Musa paradisiaca*.
Java, Bogor ZIMMERMANN, Jan. 1950 B.

MYRTACEAE

Cercospora epicoccoides COOKE et MASSEE, Grevillea 19, 91, 1891.
on *Eucalyptus alba*.
Java, Bogor June 1950 Forest Research Institute.

On *Eucalyptus* there occurs another species viz. *Cercospora eucalypti* COOKE et MASSEE, Grevillea 18, 7. 1889, and according to CHUPP all material thus far collected on this tree belongs here.

This species however has non fasciculate conidiophores and 1–3 septate conidia, measuring 20–65 × 2–3½ μ. Our material has fasciculate conidiophores and olivaceous 2–6 septate conidia, 31–56 × 4–6 μ.

NYMPHAEACEAE

Cercospora nymphaeacea Cooke et Ellis, Grevillea 6, 89, 1878.
Syn.: *Cercospora exotica* Ellis et Everh., Proc. Acad. Nat. Sc. Philad. 45, 463, 1893.
Cercospora nelumbonis Tharp, Mycologia 9, 111, 1917.
Cercosporina nelumbonis (Tharp) Sacc., Syll. Fung. 25, 912, 1931.
on *Nymphaea lotus.*
Java, Hortus Bogoriensis Dec. 1950 B.

OLEACEAE

Cercospora Puttemansii Henn., Hedwigia 41, 117, 1902.
on *Nycthantes arbor tristis.*
Java, Bogor Oct. 1949 B. Hortus Bogoriensis April 1950 B.

RANUNCULACEAE

CERCOSPORA CLEMATIDIS Boedijn nov. spec. (fig. 11)

Maculae angulatae, plerumque venulis limitatae, atro-brunneolae, 1–8 mm. longae. Caespituli hypophylli. Stromata minutissima. Conidiophora 2–20 fasciculata, vel unica, olivaceo-brunnea, septata, parce ramosa, geniculata, undulata, 21–94 × 3–4 μ. Conidia hyalina, anguste obclavata, recta vel leniter curvata, spurie 3–7 septata, ad basim subtruncata ad apicem acuta, 48–84 × 2½–3½ μ, plerumque 60–70 × 3 μ.

Leafspots typical angular, limited by leafveins, almost black in color, 1–8 mm. in length. Fruiting especially hypophyllous. Stromata slight, consisting mostly of a number of moderately thickwalled brown cells. Fascicles in groups of 2 to about 20 divergent stalks, sometimes also short branches spaced at short intervals on procumbent threads. Conidiophores brown throughout their entire length, septated, sparingly branched, geniculate, undulating 21–94 × 3–4 μ. Conidia hyaline, acicular, straight or slightly curved, indistinctly 3–7 septate, base obconic, tip acute 48–84 × 2½–3½ μ, mostly 60–70 × 3 μ.
on *Clematis zeylanica.*
Java, Hortus Bogoriensis May 1950 B.

ROSACEAE

Cercospora mali Ellis et Everh., Journ. Mycol. 4, 116, 1888.
on *Pirus malus.*
Java, Patjet Nov. 1949 v. Hoof.

RUBIACEAE

CERCOSPORA CINCHONICOLA Boedijn nov. spec. (fig. 12)

Maculae fuscae, irregulares, 2–3 mm. longae saepe confluentes. Caespituli hypophylli. Stromata parva, applanata, atro-fusca 15–40 μ diam. Conidiophora fasciculata, olivaceo-brunnea, sursum pallidiora, ramosa, parce septata, geniculata ad apicem subrotundata, 20–60 × 3–3½ μ. Conidia pallide olivacea, obclavata, leniter curvata, spurie multiseptata, ad basim subtruncata ad apicem subacuta, 64–110 × 3–4 μ, plerumque 70–75 × 3 μ.

Leafspots irregular in outline, brown, 2–3 mm. in length by coalescing much larger. Fruiting chiefly hypophyllous. Stromata small, flattened, blackish brown 15–40 μ in diameter. Fascicles fairly dense. Conidiophores brown, slightly paler at the tip, often provided here with a short side branch, sparingly septate, geniculate, tip bluntly rounded 20–60 × 3–3½ μ. Conidia pale olivaceous, narrowly obclavate, mildly curved, indistinctly multiseptate, base obconically truncate, tip rounded to subacute 64–110 × 3–4 μ, mostly 70–75 × 3 μ.
on *Cinchona* spec.
Java, Patjet Aug. 1950 Tojib Hadiwidjaja.

Cercospora coffeicola Berk. et Cooke, Grevillea 9, 99, 1881.
Syn.: *Cercospora coffeae* Zimm., Ber. Land- u. Forstw. Deutsch-Ostafrika 2, 35, 1904.
Cercospora Herrerana Farn., Atti Inst. Bot. R. Univ. Pavia ser. 2, 9, 37, 1911.
on *Coffea* spec.
Java.

CERCOSPORA GARDENIAE Boedijn nov. spec. (fig. 13)

Maculae orbiculares, pallide brunneae, 5–10 mm. diam. Caespituli amphigeni. Stromata minuta vel nulla. Conidiophora fasciculata, pallide olivaceo-brunnea, sursum pallidiora, vix septata et ramosa, ad apicem subtruncata 12–40 × 2½–3½ μ. Conidia pallidissime olivacea, fere anguste obclavata, recta vel leniter curvata, spurie multiseptata, ad basim subtruncata, ad apicem subacuta 53–78 × 2½–4 μ, plerumque 60–70 × 3 μ.

Leafspots orbicular, dull brown, 5–10 mm. in diameter. Fruiting amphigenous. Stromata slight or none. Fascicles fairly dense. Conidiophores pale brown, subhyaline towards the tip, seldom with a septum or a side branch, tip conic 12–40 × 2½–3½ μ. Conidia very pale colored, more or less acicular, straight or slightly curved, indistinctly multiseptate, base obconic, tip rounded to subacute 53–78 × 2½–4 μ, mostly 60–70 × 3 μ.
on *Gardenia jasminoides*.
Java, Hortus Bogoriensis Aug. 1950 B.

Cercospora ixorae Solheim ap. Stevens et Peirce, Indian Journ. Agr. Sc. 3, 15, 1933.
Syn.: *Cercospora ixorae* Yamamoto, Journ. Soc. Trop. Agr. 6, 602, 1934.
on *Ixora amboinensis*, *Ixora Finlaysoniana* and *Ixora* spec.
Java, Hortus Bogoriensis April, July 1950, July 1953, Oct. 1955, July 1956 B.

CERCOSPORA MITRAGYNES Boedijn nov. spec. (fig. 14)

Maculae irregulares, brunneae 2–4 mm. longae, saepe confluentes et multo majores. Caespituli epiphylli. Stromata minuta, subglobosa, fusca 12–35 μ diam. Conidiophora fasciculata, pallide olivaceo-brunnea, sursum pallidiora, haud septata et ramosa, parce geniculata, ad apicem rotundata 10–36 × 1 ½–2 ½ μ. Conidia pallidissime olivacea, fere anguste obclavata, recta vel leniter curvata, spurie 2–6 septata, ad basim subtruncata ad apicem subacuta 30–70 × 2–3 μ, plerumque 40–48 × 2 ½ μ.

Leafspots irregular, brown 2–4 mm. in length, by coalescing often much larger. Fruiting especially epiphyllous. Stromata weakly developed, subglobular, dark brown 12–35 μ in diameter. Fascicles fairly dense. Conidiophores pale brown, nearly hyaline towards the tip, not septate, unbranched, hardly geniculate, tip rounded 10–36 × 1 ½–2 ½ μ. Conidia very pale colored, almost acicular, straight to slightly curved, indistinctly 2–6 septate, base obconic, tip subacute 30–70 × 2–3 μ, mostly 40–48 × 2 ½ μ.
on *Mitragyne* spec.
Java, Hortus Bogoriensis Aug. 1950 B.

RUTACEAE

Cercospora Penzigii Sacc., Syll. Fung. 15, 84, 1901.
Syn.: *Cercospora fumosa* Penzig, Michelia 2, 476, 1882 (non *C. fumosa* Speg.).
Cercospora aurantia Heald et Wolf, Mycologia 3, 15, 1911.
on *Citrus* spec.
Java, Pasar Minggu near Djakarta Nov. 1948 B.

CERCOSPORA EVODIICOLA Boedijn nov. spec. (fig. 15)

Maculae irregulares, angulatae, plerumque venulis limitatae, pallidissime brunneae vel griseae, 2–5 mm. longae, saepe confluentes et multo majores. Caespituli amphigeni. Stromata subglobosa vel applanata, atro-fusca, 16–48 μ diam. Conidiophora olivaceo-brunnea, sursum pallidiora, septata, ramosa, parce geniculata, interdum undulata, ad apicem subtruncata 15–92 × 3 ½–5 μ. Conidia hyalina, obclavato-cylindrica, recta vel leniter curvata, spurie 3–7 septata, ad basim subtruncata, ad apicem subacuta 33–64 × 3–4 μ plerumque 36–40 × 3–3 ½ μ.

Leafspots irregular, angular and partly vein bound, very pale brown to pale gray 2–5 mm. long, by coalescing often larger. Fruiting amphigenous. Stromata subglobose to flattened, blackish brown 16–48 μ in diameter. Fascicles dense. Conidiophores brown, paler towards the tip, septate, branched, sparingly geniculate, sometimes undulate, tip conic to bluntly rounded 15–92 × $3\frac{1}{2}$–5 μ. Conidia hyaline, obclavato-cylindric, straight to slightly curved, indistinctly 3–7 septate, base obconic, tip rounded 33–64 × 3–4 μ, mostly 36–40 × 3–$3\frac{1}{2}$ μ.
on *Evodia Ridleyi* and *Evodia* spec.
Java, Hortus Bogoriensis June, Dec. 1950, July 1953 B.

SAXIFRAGACEAE

Cercospora hydrangeae ELLIS et EVERH., Journ. Mycol. 8, 71, 1902.
Syn.: *Cercosporina hydrangicola* SPEG., Anal. Mus. Nac. Buenos Aires 20, 426, 1910.
Cercospora hydrangeana THARP, Mycologia 9, 110, 1917.
Cercospora arborescentis TEHON et DANIELS, Mycologia 17, 246, 1925.
Cercosporina hydrangeana (THARP) Sacc., Syll. Fung. 25, 915, 1931.
on *Hydrangea* spec. *(Hortensia)*.
Java, Hortus Bogoriensis April 1950 B.

SIMAROUBACEAE

Cercospora bruceae PETCH, Ann. R. Bot. Garden Peradeniya 4, 306, 1909.
on *Brucea amarissima*.
Java, Bogor Dec. 1949 B.

SOLANACEAE

Cercospora nicotianae ELLIS et EVERH., Proc. Acad. Sc. Philad. 45, 170, 1893.
Syn.: *Cercospora Raciborskii* SACC. et SYD., Syll. Fung. 16, 1070, 1902.
on *Nicotiana tabacum*.
Sumatra, Deli 1931, 1933 JOCHEMS.
Java, Bogor 1900 R. Klaten 1939 THUNG.
Cercospora solani-melongenae CHUPP, Bothalia 4, 892, 1948.
on *Solanum melongenum*.
Java, Bogor July 1943 B.

STEMONACEAE

CERCOSPORA STEMONAE Boedijn nov. spec. (fig. 16)

Maculae suborbiculares vel elongatae, fere albidae, zonula obscuriore limitatae, 1–3 mm. diam. per confluentes multo majores. Caespituli amphigeni. Stromata applanata, fusca 20–50 μ diam. Conidiophora fasciculata, pallide olivaceo-brunnea, sursum pallidiora, vix septata et geniculata, ad apicem subtruncata 16–50 × 3–4½ μ. Conidia pallide olivacea, cylindro-obclavata, recta vel leniter curvata, evidenter 5–14 septata, plerumque 7 septata, ad basim subtruncata, ad apicem subrotundata vel subacuta 58–104 × 3½–4½ μ, plerumque 68–72 × 4 μ.

Leafspots subcircular to elongated, nearly white with a broad dark border, 1–3 mm. in diameter, by coalescing often much larger. Fruiting amphigenous. Stromata somewhat flattened, dark brown 20–50 μ in diameter. Fascicles fairly dense. Conidiophores pale brown with subhyaline tip, mostly not septate, nor geniculate, tip subconic 16–50 × 3–4½ μ. Conidia pale olivaceous, cylindro-obclavate, straight or slightly curved, distinctly 5–14 septate, mostly 7 septate, base obconic, tip more or less rounded to subacute, 58–104 × 3½–4½ μ, mostly 68–72 × 4 μ.
on *Stemona* spec.
Java, Hortus Bogoriensis April 1950 B.

STERCULIACEAE

Cercospora helicteris Syd., Philipp. Journ. Sc. 9, 189, 1914.
on *Helicteris hirsuta*.
Java, Hortus Bogoriensis May 1950 B.

TACCACEAE

Cercospora taccae (Syd.) Chupp, Mon. Fungus genus Cercospora p. 560, 1953.
Syn.: *Cercosporina taccae* Syd., Ann. Mycol. 11, 406, 1913.
on *Tacca macrantha* and *Tacca palmata*.
Java, Bogor June 1950, Hortus Bogoriensis July 1950 B.

THEACEAE

Cercospora theae (Cavara) v. Breda de Haan, Inst. Bot. Buitenzorg Bull. 6, 11, 1900.
Syn.: *Septoria theae* Cavara, Revue Mycol. 11, 190, 1889.
Cercoseptoria thea (Cavara) Curzi, Boll. R. Staz. Pat. Veg. n.s. 9, 373, 1929.
on *Camellia sinensis* var. *assamica*.
Java, Bogor v. Breda de Haan, Sukabumi May 1950 Reitsma.

URTICACEAE

Cercospora boehmeriae Peck, N.Y. State Mus. Nat. Hist. Ann. Rep. 34, 48, 1881.

Syn.: *Cercospora boehmeriae* Fukui, Journ. Plant Prot. 5, 734, 1918.
Cercospora Fukui Yamamoto, Journ. Soc. Trop. Agr. 6, 601, 1934.

on *Boehmeria nivea*.

Java, Bogor Nov. 1949, Hortus Bogoriensis June 1950 B.

VERBENACEAE

Cercospora clerodendri Miyake, Bot. Magazine, Tokyo 27, 53, 1913.

on *Clerodendron calamitosum*, *Cl. hastatum*, *Cl. serratum* and *Cl. Thomsonae*.

Java, Hortus Bogoriensis May, June, July, Aug. 1950, Aug. 1954, Jan. 1955 B.

Cercospora volkameriae Speg., Revista del Museo de La Plata 15, 47, 1908.

on *Clerodendron fragrans*.

Java, Hortus Bogoriensis May, Aug. 1950 B.

A species well marked by its long conidia, which in this material are 140–200 × 4–5 μ.

CERCOSPORA PREMNICOLA Boedijn nov. spec. (fig. 17)

Maculae indeterminatae, pallide brunneae, 4–10 mm. longae, saepe confluentes et multo majores. Caespituli hypophylli, effusi. Stromata deficiens. Conidiophora unica, olivaceo-brunnea, interdum ramosa, septata, geniculata et flexuosa, ad apicem subtruncata 10–60 × 3–5 μ. Conidia pallide olivacea, obclavato-cylindrica vel fere cylindrica, leniter curvata, evidenter 6–12 septata, ad basim truncata ad apicem subobtusa 96–160 × 3–4 μ, plerumque 112–120 × 3½ μ.

Leafspots indefinite, often running along the veins, pale brown, 4–10 mm. long, by coalescing much larger. Fruiting hypophyllous, effuse. Stromata lacking. Conidiophores brown, sometimes branched, septate, geniculate and often tortuous, tip bluntly rounded, 10–60 × 3–5 μ, borne as erect branches spaced at rather short intervals on procumbent threads. Those hyphae pale brown, branched, septated 1½–3½ μ broad. Conidia pale olivaceous obclavato-cylindric to almost cylindric, slightly curved, distinctly 6–12 septate, base truncate, tip rounded 96–160 × 3–4 μ, mostly 112–120 × 3½ μ.

on *Premna pubescens*.

Java, Hortus Bogoriensis May 1950 B.

Cercospora tectonae Stevens Bernice P. Bishop Mus. Bull. 19, 155, 1925.

on *Tectona grandis*.

Java, Hortus Bogoriensis April 1950 B.

ZINGIBERACEAE

CERCOSPORA HEDYCHII Boedijn nov. spec. (fig. 18)

Maculae indeterminatae, pallide griseo-brunneolae. Caespituli amphigeni. Stromata absunt vel minuta. Conidiophora fasciculata vel unica, ad basim pallide brunnea in superiore parte subhyalina, parce ramosa, raro septata et geniculata, ad apicem subtruncata 6–52 × 2–3 μ. Conidia hyalina, anguste obclavata, recta vel leniter curvata, spurie multiseptata 41–70 × 2–3 μ, plerumque 50–60 × 2 ½ μ.

Leafspots especially along the border and tip of the leaf, pale brownish gray in color, soon coalescing and indefinite in shape and dimensions. Fruiting amphigenous. Stromata slight or none. Fascicles rather dense, but also isolated branches on procumbent threads present. Conidiophores showing a brown color only at the base, where they are densely grouped. Rest of thread subhyaline, very rarely branched, mostly unseptated, weakly geniculate, tip conic 6–52 × 2–3 μ. Conidia hyaline, acicular, straight or slightly curved, indistinctly multiseptate 41–70 × 2–3 μ, mostly 50–60 × 2½ μ.
on *Hedychium coccineum*.
Java, Hortus Bogoriensis June 1950 B.

CERCOSPORA NICOLAIAE Boedijn nov. spec. (fig. 19)

Maculae indeterminatae, pallide griseo-brunneolae, saepe zonula brunnea cinctae, subinde confluendo et totam folii omnino obtegentes. Caespituli amphigeni. Stromata minuta. Conidiophora plerumque densiuscule fasciculata, olivaceo-brunnea, septata, non ramosa, vix geniculata, undulata, ad apicem subtruncata 30–140 × 2 ½–4 μ. Conidia hyalina, anguste obclavata, recta vel leniter curvata, spurie 3–6 septata, ad basim subtruncata ad apicem subacuta 40–87 × 2 ½–4 μ, plerumque 56–64 × 3 μ.

Leafspots indefinite, pale grayish brown, sometimes with a brown margin, later large blotches covering much of the leaf surface. Fruiting amphigenous. Stromata slight. Fascicles in bundles of parallel threads, sometimes very dense, resembling almost coremia. Conidiophores brown throughout their entire length, richly septated, not branched, hardly geniculate, wall often undulating, tip conic 30–140 × 2½–4 μ. Conidia hyaline, narrow obclavate, straight or slightly curved, indistinctly 3–6 septate, base subtruncate, tip subacute 40–87 × 2½–4 μ, mostly 56–64 × 3 μ.
on *Nicolaia* spec.
Java, Bogor Febr. 1949 B.

EXCLUDED SPECIES

Cercospora acerosum Dickhoff et Hein, Arch. Java Suikerindustr. 9, 1009, 1901.

on *Saccharum officinarum.*
Java, Pasuruan.
Description wholly insufficient.

Cercospora undulata (BERNARD) SACC., Syll. Fung. 22, 1415, 1913.
Syn.: *Ramularia undulata* BERNARD Bull. Dept. Agr. Ind. Néerl. Buitenzorg 11, 47, 1907.
on *Aglaia odorata.*
Java, Bogor BERNARD.
According to CHUPP, this is most probably a *Helminthosporium.*

Cercospora villebruneae v. HÖHNEL, Sitzungsber. K. Akad. Wiss. Wien 121, 413, 1912.
on *Villebrunea sylvatica.*
Java, Hortus Bogoriensis 1907 v. HÖHNEL.
According to CHUPP this may be an *Alternaria.*

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EXPLANATION OF THE PLATES

Fig. 1: Conidiophores and conidia of *Cercospora thunbergiae.*
Fig. 2: Conidiophores and conidia of *Cercospora schefflerae.*
Fig. 3: Conidiophores and conidia of *Cercospora radermacherae.*
Fig. 4: Conidiophores and conidia of *Cercospora combreti.*
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Fig. 18: Conidiophores and conidia of *Cercospora hedychii.*
Fig. 19: Conidiophores and conidia of *Cercospora nicolaiae.*

New Species of Nephrochytrium from the English Lake District

By L. G. Willoughby, Ambleside[1])

With plates 112 (1) – 116 (5)

A study of Chytridiales (aquatic Phycomycetes) obtained by baiting permanently submerged lake muds with complex organic substrata has shown that a number of saprophytic species, e.g. *Asterophlyctis sarcoptoides* Petersen, *Chytriomyces hyalinus* Karling, and *Nowakowskiella profusa* Karling, are widely distributed and occur in a number of water bodies in the English Lake District. This contribution concerns two species which appear to be more restricted in their distribution, since each has so far been obtained from a single lake only.

Although it seems clear that these two particular species are undescribed ones, it has proved difficult to place them in a known genus. Both are monocentric, eucarpic, and apophysate, with a persistent zoospore cyst. Since the last feature occurred so consistently in both, I am inclined to attach special significance to it, and to place these two chytrids in the genus *Nephrochytrium* rather than in *Diplophlyctis*. In this connection, the fact that one of the forms under discussion is apparently inoperculate, is a distinct embarrassment. However, a great extension of our present knowledge will obviously be necessary before chytrids in the "*Nephrochytrium-Diplophlyctis*" complex can finally be segregated or grouped satisfactorily.

Nephrochytrium complicatum was obtained from Ennerdale Water using purified shrimp chitin (Karling, 1945) as bait, while *Nephrochytrium buttermerense* was obtained from Buttermere using cellophane as bait (Willoughby, 1958). There was a persistent zoospore cyst in both species. This became thickened and vestigial in the case of *Nephrochytrium complicatum*, but remained thin-walled and was incorporated into the rhizoidal system in the case of *Nephrochytrium buttermerense*.

NEPHROCHYTRIUM COMPLICATUM sp. nov.

In the development of *Nephrochytrium complicatum*, thickening of the zoospore cyst took place extremely early [Plate 112 (1) b–d]. If a

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germ tube was formed [Plate 112 (1) e, g, k], this too soon became thickened. Eventually a considerable zone of yellow thickened wall material extended from the zoospore cyst round part of the sporangium [Plate 112 (1) m–q]. At maturity, the sporangium was often very irregular in shape, and frequently consisted of two oval portions folded together with the apophysis at the point of junction [Plate 112 (1) r–u]. A large number of dehisced sporangia were available for examination [Plate 113 (2) a–h], and a study of these suggested that the dehiscence mechanism was inoperculate. Resting spores were found in close association with the sporangia. The fact that they sometimes had a wide lobe of thickening essentially similar to that seen in sporangia [Plate 113 (2) j, o], constituted strong confirmatory evidence that they were a stage in the life history of *Nephrochytrium complicatum*. Observations made on developing resting spores were limited, and it is not yet clear whether they were formed asexually or as the result of sexual fusion between two thalli. A zoospore cyst was seen only in a low percentage of cases. It was connected to the rhizoidal system and apophysis rather than to the resting spore itself (Plate 113 (2) i, l]. If the resting spore was asexually formed, therefore, the mode of development from the zoospore was unlike that observed for the sporangium. At maturity, resting spores were ornamented with yellow hollow spines and contained granular cytoplasm. The following diagnosis is proposed for this species.

Nephrochytrium complicatum sp. nov.

Thallus monocentricus, eucarpicus, consistens ex ovato aut lobato sporangio cum 1–3 tubulis qui exitum praebent, aut spora quiescenti formae globosae, cum apophyside quae propagat unam aut complures stirpes asperas et ramosas et rhizoidales. Sporangium ovatum, 12.5–55 μ × 7.5–35 μ, aut formae inaequalis et asymmetricae. Hoc cum accidit neque illud, persaepe constat e duabis partibus ovatis 35–45 μ × 20–30 μ, quae duae partes sunt altera super alteram complicatae. Adiuncta est sporangio flava zoospora perstans et crassata cum involucro, 2.5–5 μ per medium dimetiens. Nonnunquam fieri potest ut adsit quoque tubulus crassatus unde crescunt germina, qui tubulus e zoosporo cum involucro oritur, 1.5–20 μ longus × 1.5–3 μ latus. Ubi zoospora cum involucro vel tubulus unde crescunt germina cum sporangio coniuncta est, murus sporangii est plerumque flavus et praeterea crassatus. Quae in muro sporangii crassitudo potest interdum per medium dimetiri usque ad 8 μ et a latere usque ad 40 μ. Apophysise 4.5–15 μ alta × 3–15 μ lata. Ei tubuli qui exitum praebent sunt numero 1–3 et 10–60 μ longi (perraro usque ad 110 μ longi) et 3.5–12.5 μ lati. Zoosporae liberantur cum dissolvitur cacumen tubuli qui exitum praebet. Zoosporae sunt formae globosae, 4 μ diam., cum guttula olei hyalina 1–2 μ diam., et flagello posteriore.

Sporae quiescentes 13–27 μ diam., ornatae flavis spinis cavis 2.5–5 μ altis ×1.5–3.5 μ latis, cum apophyside 5–7.5 μ alta×5–10 μ lata. Zoospora cum involucro perstans interdum adiuncta est sporae quiescenti quo in loco sunt rhizoides et apophysise. Ex luto submerso ex Ennerdale, Regione Lacuum Anglicorum, saprophyticum, esca "chitin" fruens.

Thallus monocentric, eucarpic, consisting of an oval or lobed sporangium with 1–3 exit tubes, or of a spherical resting spore, together with an apophysis from which extends one to several coarse, branched, rhizoidal axes. Sporangium oval, 12.5–55×7.5–35 μ, or irregular. In the latter case it is frequently composed of two oval portions 35–45×20–30 μ, which are folded together. Attached to the sporangium is a yellow, thickened, persistent, zoospore cyst, 2.5–5 μ across. A thickened germ tube, developed from the zoospore cyst, and 1.5–20 μ long ×1.5–3 μ wide, may also be present. Where the zoospore cyst or germ tube joins the sporangium, the wall of the latter is usually yellow and thickened also. This thickening on the sporangium wall may be up to 8 μ across and extend laterally up to 40 μ. Apophysis 4.5–15 μ tall ×3–15 μ wide. Exit tubes are 1–3 in number and 10–60 μ long (very exceptionally up to 110 μ long), and 3.5–12.5 μ wide.

Zoospores are released when the tip of the exit tube dissolves. Zoospores spherical, 4 μ diam., with a hyaline oil globule 1–2 μ diam., and posterior flagellum.

Resting spore 13–27 μ diam., ornamented with yellow, hollow, spines, 2.5–5 μ tall×1.5–3.5 μ wide, and with an apophysis 5–7.5 μ tall×5–10 μ wide. A persistent zoospore cyst is sometimes attached to the resting spore in the region of the rhizoids and apophysis. From submerged mud from Ennerdale, English Lake District, saprophytic on "chitin" bait.

NEPHROCHYTRIUM BUTTERMERENSE sp. nov.

In the development of *Nephrochytrium buttermerense*, the germ tube formed by the zoospore became transformed into a rhizoid [Plate 114 (3) b, d–g]. Further growth of this rhizoid usually took place in both directions from the zoospore cyst, and thus the latter remained functional. In certain cases, [Plate 115 (4) p], growth of the germ tube into a rhizoid proceeded in such a fashion that the outline of the original zoospore cyst became partly obliterated. Comparatively early in development, and before the sporangium was cut off by a cross wall from the apophysis, the lower walls of the latter became appreciably thickened with hyaline material [Plate 114 (3) h–j; Plate 116 (5) b]. The cross wall itself, however, was never thickened to any great extent [Plate 115 (4) a, d, i–m, o, q]. After dehiscence, it was not unusual to

find that the outer rim of the endo-operculum had not been carried out by the emerging zoospore mass, but remained in position [Plate 115 (4) g–j, o]. Reflexed wall material sometimes occurred at the exit pore rim, giving the latter a striking frill-like appearance [Plate 115 (4) g; Plate 116 (5) e]. The following diagnosis is proposed for this species.

Nephrochytrium buttermerense sp. nov.

Thallus monocentricus, eucarpicus, consistens ex sporangio cum uno aut duobus tubulis qui exitum praebent et apophyside inaequaliter crassata unde crescunt una aut complures stirpes asperae et ramosae et rhizoidales. Est zoospora cum involucro perstans quae manet muris angustis cincta et cum una inter has stirpes rhizoidales est commixta. Sporangia formae globosae, 40–70 μ diam., aut ovata, 20–90 μ longa × 15–70 μ lata. Tubuli qui exitum praebent 22–70 μ longi (interdum usque ad 180 μ longi) et 9–16 μ lati, cum operculo submerso sito infra foramen usque ad 15 μ. Apophysise plerumque est campanulatae formae, 13–25 μ alta × 9–30 μ lata, cum crassitudine muri hyalini inaequaliter conformati qui interdum usque ad 7.5 μ per medium dimetitur. Zoospora cum involucro perstans est formae globosae, 4–5 μ diam., aut ovata, 5–6 μ longa × 4–4.5 μ lata, sita 6–25 μ ab apophyside et nonnunquam usque ad 60 μ. Zoosporae liberantur cum operculum submersum disponitur. Zoosporae sunt formae globosae, 5–6 μ diam., cum guttula olei hyalina a latere sita 2.5–3.0 μ diam., conformatione supra nucleum forma lunae crescentis, et flagello posteriore 23–30 μ longo. Non observavimus sporas requiescentes. Ex luto submerso ex Buttermere, Regione Lacuum Anglicorum, saprophyticum, esca "Cellophane" fruens.

Thallus monocentric, eucarpic, consisting of a sporangium with 1 or 2 exit tubes and an unevenly thickened apophysis from which extends one to several coarse, branched, rhizoidal axes. There is a persistent zoospore cyst which remains thin walled, and is incorporated into one of these rhizoidal axes. Sporangia spherical, 40–70 μ diam., or oval, 20–90 μ long × 15–70 μ wide. Exit tubes 22–70 μ long (sometimes up to 180 μ in length), and 9–16 μ wide, with a sunken operculum situated up to 15 μ below the pore. Apophysis usually campanulate in shape, 13–25 μ tall × 9–30 μ wide, with unevenly developed hyaline wall thickening which may be up to 7.5 μ across. The persistent zoospore cyst is spherical, 4–5 μ diam., or oval, 5–6 μ long × 4–4.5 μ wide, and is situated 6–25 μ from the apophysis, and sometimes as far as 60 μ. Zoospores are released when the sunken operculum is displaced. Zoospores spherical, 5–6 μ diam., with a lateral hyaline oil globule, 2.5–3.0 μ diam., nuclear cap, and posterior flagellum 23–30 μ long. Resting spore not observed. From submerged mud from Buttermere, English Lake District, saprophytic on "Cellophane" bait.

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EXPLANATION OF THE PLATES 112 (1) – 116 (5)

Plate 112 (1): *Nephrochytrium complicatum* sp. nov. a, zoospores; b, a very young thallus with persistent zoospore cyst thickened; c, young thalli with persistent zoospore cysts thickened; d, young thalli showing developing sporangium and apophysis; e, a young thallus with thickening in the persistent zoospore cyst, germ tube, and part of the sporangium; f, g, young thalli with well developed rhizoidal systems; h, a grossly thickened young thallus; i, a young thallus in which the persistent zoospore cyst may have enlarged during development; j, k, young thalli; l, part of an immature thallus showing extensive thickening in the persistent zoospore cyst, germ tube, and sporangium; m–q, thalli approaching maturity as sporangia; r, a mature sporangium with a broad exit tube; s, a mature sporangium with a long thickened germ tube and long exit tube; t, a mature sporangium showing typical irregular shape; u, a mature sporangium with two exit tubes. All drawings except o are at the scale below t.

Plate 113 (2): *Nephrochytrium complicatum* sp. nov. a, b, small dehisced sporangia with thickening confined to the persistent zoospore cyst; c–f, larger dehisced sporangia with more extensive thickening on the sporangium wall; g, a dehisced sporangium with 3 exit tubes; h, a dehisced sporangium, the thin walled portion of which has collapsed; i, a young resting spore with attached thickened persistent zoospore cyst; j, a young resting spore with a wide lobe of thickening; k, a young resting spore with spines not developed; l, optical section of a resting spore with an attached persistent zoospore cyst; m, n, mature resting spores showing spines; o, optical section of a mature resting spore with a wide lobe of thickening. All drawings except d, e, and g are scale below m.

Plate 114 (3): *Nephrochytrium buttermerense* sp. nov. a, zoospores; b, a young thallus showing empty persistent zoospore cyst (below) con-

nected by the germ tube to the apophysis and sporangium; c–g, young thalli with the apophysis becoming thickened; h, a young thallus showing persistent zoospore cyst incorporated into the rhizoidal system; i, a young thallus with a very irregular apophysis; j, young thalli with the apophysis heavily thickened but not yet cut off by a cross wall; k, a young thallus in which growth from the zoospore cyst proceeded in one direction only; l, a young thallus with the apophysis delimited by a cross wall; m, q, thalli approaching maturity as sporangia. The apophysis is delimited, and there is a zone of clear cytoplasm immediately below the exit tube apex; n, a later stage in development with the exit tube apex open, and endo-operculum developed; o, a cone-shaped endo-operculum; p, a young thallus showing one exceptionally wide rhizoid immediately below the apophysis. All drawings except p and q are at scale below m.

Plate 115 (4): *Nephrochytrium buttermerense* sp. nov. a–c, mature sporangia showing a persistent zoospore cyst; d, two mature sporangia borne on a single branched apophysis; e, a mature sporangium; f, an endo-operculum in a mature sporangium; g, an exit tube apex after dehiscence showing remains of endo-operculum, and reflexed wall material at the exit pore; h, an exit tube apex after dehiscence showing remains of endo-operculum; i, a dehisced sporangium showing a long exit tube; j, k, dehisced sporangia with peristent zoospore cysts; l, a dehisced sporangium with two exit tubes; m, o, q, the apophysis and rhizoidal system seen in three dehisced sporangia; n, the persistent zoospore cyst of m drawn at a higher level of focus; p, a persistent zoospore cyst. As the result of growth, part of its outline has become obliterated. All drawings except d, e, i–l, are at the scale below b.

Plate 116 (5): *Nephrochytrium buttermerense* sp. nov. a, young thalli, one of which shows a persistent zoospore cyst; b, a young thallus at the cellophane edge. The apophysis is becoming thickened but is not yet cut off by a cross wall; c, a dehisced sporangium showing the relation of the persistent zoospore cyst to the rhizoidal system and apophysis; d, a drawing of c made to emphasize relevant details; e, an exit tube after dehiscence showing remains of the endo-operculum, and reflexed wall material at the exit pore; f, a dehisced sporangium. In a, c, and f, the persistent zoospore cyst is indicated by an arrow. All photographs are ×840.